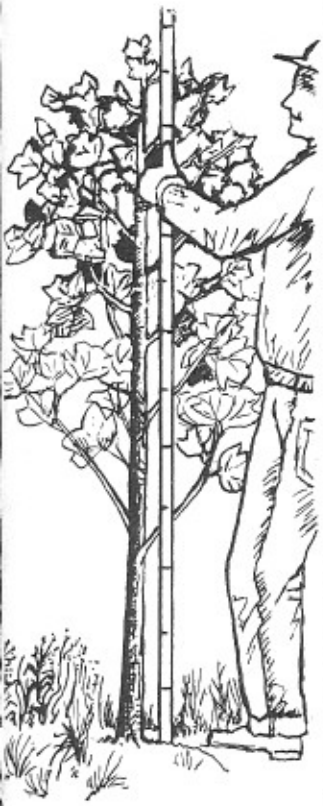

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LOBLOLLY PINE RELEASE STUDY

REPORT NUMBER

7

Virginia
Department of Forestry

LOBLOLLY PINE RELEASE
Report # 7

by
Thomas A. Dierauf

Abstract. This study included two treatments: no release and mist-blowing of 2,4,5-T with a backpack mist-blower during the second growing season. Hardwood competion varied from light to severe over the study area, and on the average was probably moderate. At age 16, mist-blown plots averaged 30 percent more basal area and 43 percent more volume in standard cords than check plots. In general, cordwood yields at age 16 related fairly well to hardwood basal area present at age 8 (r^2 = .545).

INTRODUCTION

This is the seventh in a series of Occasional Reports concerning release of loblolly pine seedlings from hardwood competition. This particular study was installed on the privately-owned Walter Coles tract in Albemarle County, in the west central Piedmont of Virginia (the study reported in Release Report #5 is located adjacent to this study). The previous stand of mixed hardwoods, predominantly oak, was cut during 1966 and prescribe-burned in November of 1966. The fire was hot enough to kill practically all of the larger hardwoods remaining from the harvest operation. Loblolly pine seedlings were planted in March of 1967. Sprout competition was mostly from chestnut oak, scarlet oak, black oak, southern red oak, red maple, and yellow poplar, with some black gum and other miscellaneous hardwoods.

The release study was installed during the summer of 1968. Six swaths, each 80 feet wide and 360 feet long, were laid out and alternate swaths were mist-blown (Figure 1). A backpack mist-blower was used to apply 2 pounds active ingredient of 2,4,5-T per acre. The mist-blowing was done on July 9, 1968, during the second growing season. Mist-blowing was done by walking the boundaries between swaths and directing the spray toward the center of the swaths to be released. Mist-blown swaths were sprayed from both directions, assuming that the spray material would carry at least 40 feet and therefore give complete coverage of the 80-foot swath. We did the mist-blowing when there was no wind, but some damage from drift still occurred over all three of the check swaths, and the damage was considerable in places. Because of this damage from drift, our initial reaction was to abandon the study and not install growth plots. A few years after the spraying was done, however, the contrast between the released and check swaths was so great that we decided to go ahead and install plots anyway, recognizing that the check swaths had received at least a small degree of release.

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toward the back of the study area to avoid severe drift damage (Figure 1). At the time the plots were installed, hardwood competition was severe in check plots 5 and 6 and light to moderate in the remaining check plots. Volunteer Virginia and shortleaf pines were cut down when the plots were installed.

Plots were measured three times, at establishment (age 8) and at ages 12 and 16. We had intended to make a final measurement at age 20, but due to a mix up in communications, the area containing the study was thinned for pulpwood just a few weeks before we planned to measure it. Diameter at breast height of each loblolly pine was measured to the nearest inch. For a sample of trees in each diameter class, total height to the nearest foot was also measured, noting which trees were dominant or codominant. Because we missed the intended final measurement, the only hardwood data we have is what we (fortunately) took at age 8: a tally by species and diameter class of all hardwoods greater than .5 inches DBH.

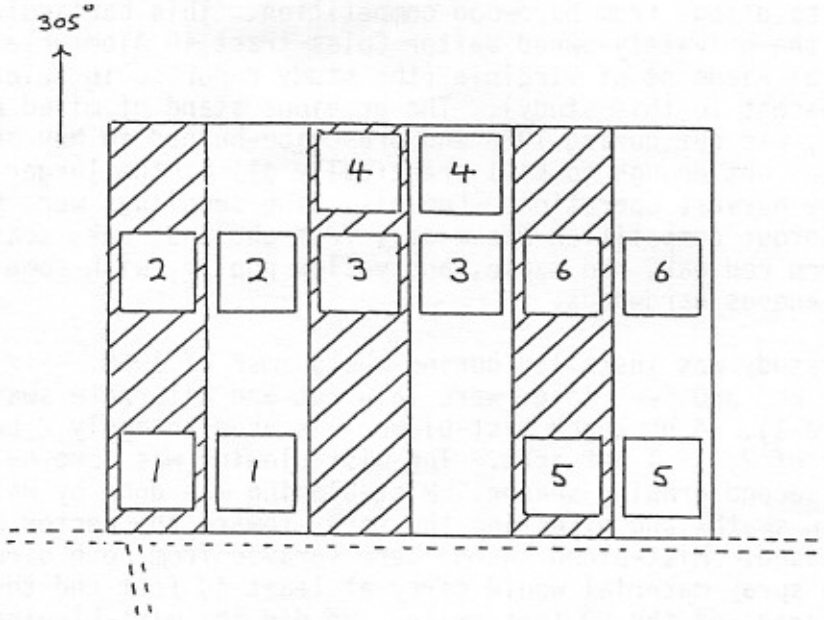

FIGURE 1. Layout of study and growth plots.
Mist-blown swaths are cross-hatched.

RESULTS AND DISCUSSION

A summary of loblolly pine data for the three measurements is presented in Table 1. At age 16, mist-blown plots averaged 4.6 standard cords more per acre than check plots.1/ Differences due to release increased with time. Basal area differences were 12.9, 20.6, and 21.9 square feet per acre at ages 8, 12, and 16 respectively, and yield differences were 3.5 and 4.6 cords at ages 12 and 16. Table 2 presents stand tables for loblolly pine at age 16.

A summary of average hardwood data from the initial measurement at age 8 is presented in Table 3. On the average, check plots had almost twice as many hardwood stems and twice the hardwood basal area. Table 4 presents hardwood data for individual plots, giving numbers of trees by diameter class and basal area per acre for trees greater than .5 inches DBH.

Cordwood yields of loblolly pine at age 16 relate fairly well to the amount of hardwood present at age 8. Figure 2 shows pine cordwood yields at age 16 relative to hardwood basal area at age 8 in stems greater than .5 inches DBH, for the twelve plots. A simple linear regression fitted to the data accounted for 54 percent of the variation in cordwood yields.2/

The twelve plots varied considerably in pine stocking when the plots were installed at age 8. Loblolly stocking on the check plots ranged from 340 to 650 trees per acre and on the mist-blown plots from 290 to 700 trees per acre. There is a significant relationship between cordwood yields at age 16 and number of loblolly per acre at age 8 (Figure 3). The simple linear regression lines in Figure 3 were fitted separately to the check and mist-blown plots, and have almost identical slopes.

1/ Standard cords at age 16 were subjected to an analysis of variance. Yields on mist-blown plots were significantly greater than yields on check plots (probability of larger F = .047).

2/ Estimated standard cords = 21.82 - .600 (hardwood basal area), r^2 = .545, probability of a larger F = .006.

Table 1. A summary of loblolly pine data for check and mist-blown plots at ages 8, 12, and 16 years: number of trees per acre, average DBH, basal area per acre, standard cords per acre, and average height of dominant and codominant trees.

		Check						Mist-blown				
Age	Plot	No.	DBH	B.A.	Cds.	Ht.	Plot	No.	DBH	B.A.	Cds.	Ht.
8	1	340	2.88	18.5	-	22.8	1	380	4.00	36.0	-	24.4
	2	480	3.92	41.3	-	25.5	2	420	3.86	36.0	-	24.4
	3	620	3.73	51.8	-	26.1	3	590	4.17	58.8	-	26.0
	4	580	3.64	44.6	-	26.8	4	700	3.68	57.7	-	25.1
	5	460	1.39	8.4	-	19.7	5	290	3.70	23.6	-	22.1
	6	650	2.28	23.6	-	23.6	6	570	3.96	53.9	-	26.5
Means		522	2.97	31.4	-	24.1		492	3.90	44.3	-	24.8
12	1	320	4.04	33.2	2.6	33.3	1	380	5.47	66.4	8.0	35.8
	2	470	5.11	71.1	8.3	37.1	2	400	5.25	63.8	7.0	37.0
	3	610	4.87	84.9	9.2	36.0	3	600	5.25	95.0	11.9	37.3
	4	570	4.60	69.8	6.6	36.4	4	690	4.62	90.5	10.0	36.2
	5	320	2.55	16.2	.6	33.0	5	260	5.54	45.4	4.9	33.8
	6	590	3.43	47.4	3.7	35.6	6	560	5.04	85.1	10.6	37.8
Means		480	4.10	53.8	5.2	35.2		482	5.20	74.4	8.7	36.3
16	1	290	5.28	48.7	6.4	39.2	1	370	6.24	84.6	14.5	43.4
	2	470	5.91	94.8	15.9	45.4	2	390	6.08	84.4	13.0	40.7
	3	590	5.64	108.9	16.9	43.1	3	580	5.90	116.1	19.6	44.3
	4	550	5.31	89.9	13.7	45.0	4	650	5.40	114.9	17.9	42.1
	5	230	4.05	25.2	2.6	39.2	5	260	6.46	62.2	10.1	40.6
	6	560	4.23	67.8	8.6	40.3	6	520	5.85	104.9	16.8	43.5
Means		448	5.07	72.6	10.7	42.0		462	5.99	94.5	15.3	42.4

Table 2. Average number of loblolly pine per acre by diameter class at age 16.

DBH	Check Plots	Mist-Blown Plots
1	22	3
2	20	10
3	32	35
4	65	40
5	95	70
6	116	135
7	70	95
8	25	54
9	3	18
10		2
Totals	448	462

Table 3. Average numbers of hardwoods (greater than .5 inches) per acre by species and diameter class, and basal area per acre, at age 8.

	Check Plots					Mist-blown Plots			
	DBH					DBH			
Species	1	2	3	4	Totals	1	2	3	Totals
Chestnut oak	833	185	15	2	1,035	392	47	2	441
Red oak	448	77	8		533	288	50	2	340
White oak	83	12			95	118	7		125
Red maple	217	35			252	365	28	3	396
Yellow poplar	248	10	7		265	38	3		41
Black gum	122	3			125	5			5
Dogwood	5				5	12			12
Miscellaneous	8				8	13		2	15
Totals	1,964	322	30	2	2,318	1,231	135	9	1,375
Basal Area					19.4				10.1

Table 4. Numbers of hardwoods by diameter class and basal area on each 1/10-acre plot.

Treatment	Plot	No. of Hdwds. DBH Class 1	2	3	4	Totals	BA
Check	1	173	41	3		217	1.99
	2	205	27	4		236	1.90
	3	216	23	2		241	1.78
	4	112	21	1		134	1.12
	5	223	47	7	1	278	2.67
	6	250	34	1		285	2.15
Released	1	115	15	2		132	1.05
	2	107	26	2		135	1.25
	3	76	6			82	.55
	4	164	20			184	1.33
	5	174	8	1		183	1.17
	6	103	6			109	.69

Figure 2. Pine cordwood yields at age 16 relative to hardwood basal area at age 8.

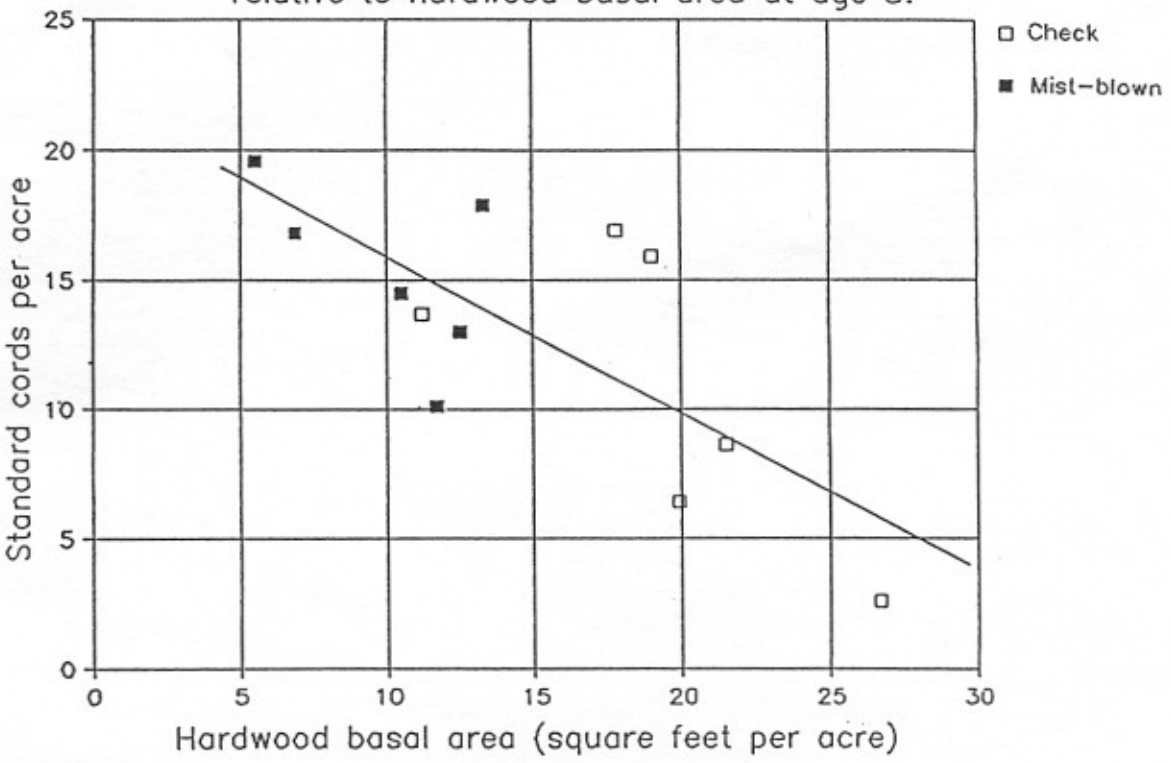

Figure 3. Pine cordwood yields at age 16 relative to number of loblolly seedlings at age 8.